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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,369	06/15/2005	Murray James McEwan	15313.0002	5087
27890 7590 02/18/2009 STEP TOE & JOHNSON LLP 1330 CONNECTICUT AVENUE, N.W. WASHINGTON, DC 20036				
EXAMINER WEISZ, DAVID G				
ART UNIT 1797		PAPER NUMBER		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/520,369

**Applicant(s)**

MCEWAN ET AL.

**Examiner**

DAVID WEISZ

**Art Unit**

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SI/02)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keough (Dimethyl Ether as a Reagent Gas for Organic Functional Group Determination by Chemical Ionization Mass Spectrometry), and further in view of Zhu et al. (Multiply hydrogen bonded complexes in ether systems: combining experiments with density functional theory calculations).

Regarding claim 1, Keough et al. discloses a method of detecting and quantifying trace levels of molecules containing one or more of a range or reactive species (see "selective detection" page 2546, column 2, lines 1-5), in gases or gas mixtures containing alkanes, ethene, or ethyne (see "presence of alkanes" page 2546, column 2,

lines 1-5), said method including using an alkoxyalkyl cation as the chemical ionization precursor (see "Primary ionization", page 2540, Experimental Section, Procedure, paragraph 1).

While Keough discloses the method taking place in a chemical ionization mass spectrometer (see "DME CI" Page 2540, Lines 10-15), the reference does not disclose the chemical ionization mass spectrometer to be specifically a selected ion flow tube mass spectrometer.

Zhu et al. teaches a method of analyzing a gas sample using selected ion flow tube mass spectroscopy (see "SIFT apparatus" page 94, section 2.1, paragraph 1) using dimethyl ether as the chemical ionization precursor (see "DME", page 94, section 2.1, paragraph 2). Selected ion flow tube mass spectroscopy is suited for quantifying reactive species concentrations in a gas mixture because ion concentrations are specifically mass selected providing a more accurate distribution (see "ion distributions", page 95, column 1, lines 5-11).

Keough and Zhu et al. are analogous because both references are directed to chemical ionization mass spectroscopy using dimethyl ether as a reagent gas in the analysis of a variety of compounds.

It would have been obvious to one having ordinary skill in the art at the time of the invention to use selected ion flow tube mass spectroscopy, as disclosed by Zhu et al., in the method of Keough, as it is a sensitive method of analyzing a wide variety of reactants.

Regarding claim 2, modified Keough discloses all of the claim limitations as set forth above. Additionally, Zhu et al. discloses the reacting of the sample gas to be analysed with the alkoxyalkyl cation in a stream of helium (see "helium carrier gas", Methods, section 2.1, paragraph 1).

Regarding claim 3, modified Keough discloses all of the claim limitations as set forth above. Additionally, Keough discloses the alkoxyalkyl cation ionisation precursor to be a methoxymethyl cation (see "ionization of the dimethyl ether", page 2540, column 2, lines 50-55).

4. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keough (Dimethyl Ether as a Reagent Gas for Organic Functional Group Determination by Chemical Ionization Mass Spectrometry), in view of Zhu et al. (Multiply hydrogen bonded complexes in ether systems: combining experiments with density functional theory calculations), and further in view of Freitas, et al. (Characterization of an ambident electrophile: the gas phase reactivity of the methoxymethyl cation).

Regarding claim 4, Keough et al. discloses a method of detecting and quantifying trace levels of molecules containing one or more of a range or reactive species (see "selective detection" page 2546, column 2, lines 1-5), in gases or gas mixtures containing alkanes, ethene, or ethyne (see "presence of alkanes" page 2546, column 2, lines 1-5), said method including using an alkoxyalkyl cation as the chemical ionization precursor (see "Primary ionization", page 2540, Experimental Section, Procedure, paragraph 1).

While Keough discloses the method taking place in a chemical ionization mass spectrometer (see "DME CI" Page 2540, Lines 10-15), the reference does not disclose the chemical ionization mass spectrometer to be specifically a selected ion flow tube mass spectrometer.

Zhu et al. teaches a method of analyzing a gas sample using selected ion flow tube mass spectroscopy (see "SIFT apparatus" page 94, section 2.1, paragraph 1) using dimethyl ether as the chemical ionization precursor (see "DME", page 94, section 2.1, paragraph 2). Selected ion flow tube mass spectroscopy is suited for quantifying reactive species concentrations in a gas mixture because ion concentrations are specifically mass selected providing a more accurate distribution (see "ion distributions", page 95, column 1, lines 5-11).

Additionally, Zhu et al. discloses the method as set forth above comprising the steps of:

producing a supply of alkoxymethyl cations (see "reactant ions are generated" and "protonated monomers", section 2.1, paragraphs 1 and 2),

mass selecting the alkoxymethyl cations (see "mass-selected", section 2.1, paragraph 1),

inducing a flow of the alkoxymethyl cations into the inlet of a flow tube of the spectrometer in a carrier flow of helium (see "injected into the flow tube by a helium carrier gas" section 2.1, paragraph 1),

reacting the gas sample in the mass spectrometer (see "neutral reactant", section 2.1, paragraph 1), and

calculating the concentration of the trace levels of molecules present in the reacted gas sample (see “detector quadrupole”, section 2.1, paragraph 1).

Keough and Zhu et al. are analogous because both references are directed to chemical ionization mass spectroscopy using dimethyl ether as a reagent gas in the analysis of a variety of compounds.

It would have been obvious to one having ordinary skill in the art at the time of the invention to use selected ion flow tube mass spectroscopy, as disclosed by Zhu et al., in the method of Keough, as it is a sensitive method of analyzing a wide variety of reactants.

Modified Keough does not disclose the molecules present in the reacted sample gas to be heteroatoms.

Freitas et al. discloses  $\text{CH}_3\text{OCH}_2^+$  to be very reactive with various neutral nucleophiles, including heteroatom containing nucleophiles such as  $\text{CH}_3\text{SH}$  and  $\text{CH}_3\text{SCH}_3$  (see Table 2, page 113).

Keough and Freitas et al. are analogous because both references are directed to the reaction and analyzation of a variety of molecules using methoxymethyl cation.

It would have been obvious to one having ordinary skill in the art at the time of the invention to use the methoxymethyl cation to analyze heteroatoms, as disclosed in Freitas et al., in the method of modified Keough because methoxymethyl cation is very reactive with a variety of heteroatom-containing nucleophiles, any of which may be found in conjunction with alkanes, which are not reactive with methoxymethyl cation. This allows for the detection of more compounds. Additionally, the use of

methoxymethyl cation is known for these properties and would give the expected results.

Regarding claim 5, modified Keough discloses all the claim limitations as set forth above. Further, Keough discloses the method wherein the alkoxymethyl cation is a methoxymethyl cation (see "ionization of the dimethyl ether", page 2540, column 2, lines 50-55).

Regarding claim 6, modified Keough discloses all the claim limitations as set forth above. Further, Freitas et al. discloses that the range of reactive species includes molecules that contain sulfur, nitrogen, oxygen, phosphorus or silicon heteroatoms (see table 2, page 113).

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

#### ***Response to Arguments***

6. Applicant's arguments filed 11/18/08 have been fully considered but they are not persuasive. On page 2 of the applicant's arguments, it is stated that the Keough reference does not disclose dimethyl ether to react with small saturated hydrocarbons.

However, on page 2546, column 2, the reference discusses the use of dimethyl ether in the selective detection of hydrocarbons, indicating a reaction. Additionally, the applicant's arguments cite the specification rather than the invention as claimed.

On page 2 of the applicant's arguments, it is stated that the Zhu reference does not teach or suggest a method of detecting and quantifying trace levels of molecules containing one or more of a range of reactive species in gases or gas mixtures containing alkanes, ethane, or ethyne, the method including using an alkoxyalkyl cation as the chemical ionization precursor. The limitations of this claim are, however, disclosed by Keough, as stated above.

Keough and Zhu et al. are analogous and combinable as stated above.

A rejection where it is necessary to modify a single reference or combine it with one or more other references is authorized by 35 U.S.C. 103 (MPEP 706.02(j)).

Being that the rejection of claim 1 is maintained, the rejections of claims 2-3 are maintained.

On page 4 of the applicant's arguments, it is stated that the Freitas reference does not teach or suggest a method of detecting and quantifying a gas sample containing trace levels of molecules containing one or more of a range of reactive species in gases or gas mixtures containing alkanes, ethane, or ethyne in a selected ion flow tube mass spectrometer that include reacting the gas sample with the alkoxyethyl cations, analyzing the reacted gas sample in the mass spectrometer, and calculating the concentration of the trace levels of molecules containing heteroatoms present in the reacted gas sample. Keough combined with Zhu teaches these limitations, as stated

above. Additionally, the Freitas reference, Table 2, discloses that methoxymethyl cation is very reactive with neutral nucleophiles, such as  $\text{CH}_3\text{SH}$  and  $\text{CH}_3\text{SCH}_3$ .

These references are analogous and combinable as stated above.

A rejection where it is necessary to modify a single reference or combine it with one or more other references is authorized by 35 U.S.C. 103 (MPEP 706.02(j)).

Being that the rejection of claim 4 is maintained, and there are no further arguments for claims 5 or 6, the rejections of claims 5-6 are maintained.

### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID WEISZ whose telephone number is (571)270-7073. The examiner can normally be reached on Monday - Thursday, 7:30 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.